SoE

Marine Corps Systems Command

Product Support /Capability Assessment Support Center

7 March 2006

Capt.

Agenda

- MCSC approach to SOE
- SOE Defined
- Evolution of Requirements
- Future Path
- Q&A

SYSCOM Strategic Goals

1. Continue to evolve the MCSC organization in order to accomplish our mission in the most effective and efficient manner.
2. Support Interoperability, Transformation and Leverage of the Joint Force Environment.
3. **Become the Driving Force behind the Adoption of Total Life Cycle Systems Management (TLCSM) in the Marine Corps.**
4. Enhance the Command's Role in Science and Technology (S&T) to Expand Technology Transitions into Programs of Record.

Goal III, Objective 1

1st Objective: Acquire the capability to monitor and improve System Operational Effectiveness (SOE) (throughout the life-cycle of our weapons systems and equipment)

Measure: Systems Operational Effectiveness Trends (Pilot Program)

Definition: The following SOE attributes will be measured for trends

Attribute	Measurement Units	
Availability	R-rating	& Operational Avail. %readiness
Reliability	Mean Time btw Critical Maint.	life units

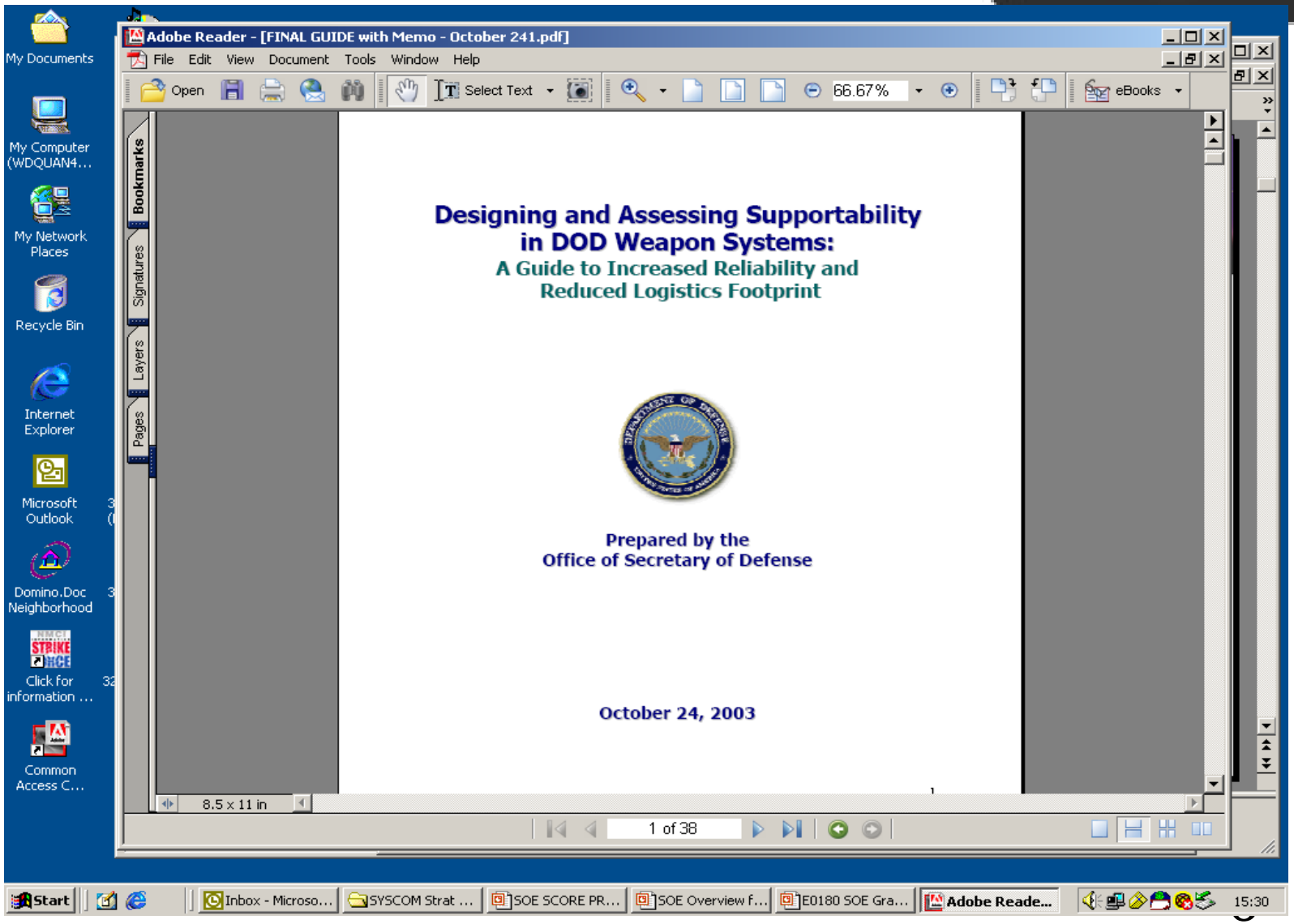
1st Objective: Acquire the capability to monitor and improve System Operational Effectiveness (SOE) (throughout the life-cycle of our weapons systems and equipment)

Measure: Systems Operational Effectiveness Trends (Pilot Program)

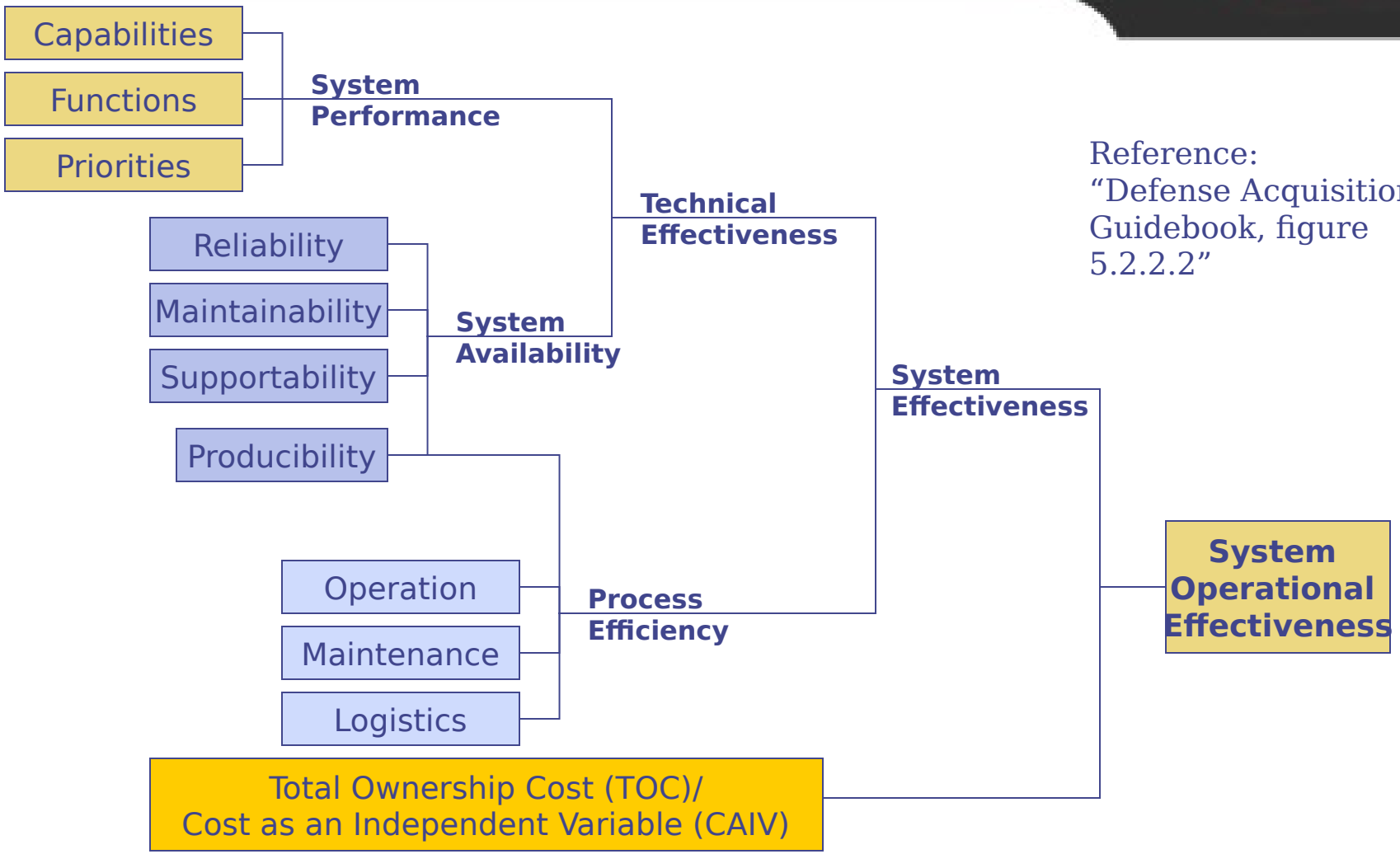
Definition: The following SOE attributes will be measured for trends

Attribute	Measurement	Units
Availability	R-rating & Operational Avail.	%readiness
Reliability	Mean Time btw Critical Maint.	life units

SOE Defined


My Documents
My Computer (WDQUAN4...
My Network Places
Recycle Bin
Internet Explorer
Microsoft Outlook
Domino.Doc Neighborhood
Click for information ...
Common Access C...
Adobe Reader - [FINAL GUIDE with Memo - October 241.pdf]
File Edit View Document Tools Window Help
Open Select Text 66.67% eBooks
Bookmarks
Signatures
Layers
Pages
Designing and Assessing Supportability in DOD Weapon Systems:
A Guide to Increased Reliability and Reduced Logistics Footprint
Prepared by the Office of Secretary of Defense
October 24, 2003
8.5 x 11 in
1 of 38
Start
Inbox - Microso...
SYSCOM Strat ...
SOE SCORE PR...
SOE Overview f...
E0180 SOE Gra...
Adobe Reade...
15:30

System Operational Effectiveness



Reference:
"Defense Acquisition Guidebook, figure 5.2.2.2"

SOE Metrics

Pilot Study Metrics* (2005)

Pilot Study Metrics* (2005)	SOE Alignment
Readiness Operational Availability (Ao)	System Availability
Mean time between Maintenance Mean time between Failure Mean time between OMF	Reliability
Maintenance Downtime Administrative Downtime Active Maintenance Time	Maintainability
Logistics Response Time (LRT) ERO count Part count Criticality Assessment by Vehicle Criticality Assessment by Part	Supportability
Parts cost per PEI	Cost

* Metrics calculated as critical and Noncritical.

TLCSM Metrics

	SOE Alignment
Operational Availability (Ao)	**System Availability**
Mission Reliability	**Reliability**
Logistics Response Time (LRT)	**Supportability**
Cost Per Unit Usage ▪ Total ▪ Operating	**Cost**
Logistics Footprint	**Logistics (PE)**
Part of Ao $\frac{Uptime}{Uptime + Downtime}$	**Maintainability**

SOE Metrics - current

Tier 1 (Command) Metrics

- Operational Availability
- Parts cost per PEI
- Mean time BTW Op Mission Failure

Tier 2 (PG) Metrics

- Operational Availability
- Parts cost per PEI
- Maintenance Downtime
- Logistics Response Time

Tier 3 (program) Metrics

- Operational Availability
- Mean time between Maintenance
- Mean time between Failure
- Mean time between OMF
- Maintenance Downtime
- Administrative Downtime
- Logistics Response Time
- Active Maintenance Time
- ERO count
- Part count
- Parts cost per PEI
- Criticality Assessment by Vehicle
- Criticality Assessment by Part

TLCSM/USMC Metrics Gap Analysis

Indicator Metric	TLCSM Defined Metric[1]	Current USMC Metric	Future USMC Metric	Gap between TLSCM and USMC
Operational Availability	Ao	Ao & MDT	TLCSM Defined Metric	None
Mission Reliability	$R_M = 1 - \frac{\#\text{ofSystemsMissionFailures}}{\#\text{ofMissionsAttempted}}$	MTBOMF	Probability of Mission Complete (Pmc)	TLCSM metric N/A to ground equip. For Pmc, need processes to capture usage information, as well as a defined mission objective (ORD, CPD, etc.)
Total Ownership Cost	TLCSM Cost per Unit Usage	Parts costs per PEI	TLCSM Defined Metric	Need to define methodology to capture and report cost on: consumables, energy, repairables, contracts, intermediate labor, unit personnel, depot maintenance, improvements or initial acquisition. Need processes to capture usage information.
	Operating Cost per Unit Usage		TLCSM Defined Metric	
Logistics Footprint	Weight, volume, and personnel of deployed supporting elements	None	TLCSM Defined Metric	Information is available. TFSMS has TUCHA data that may serve as a viable source for analogous system comparisons.
Logistics Response Time	LRT	LRT	TLCSM Defined Metric	None

[1] **Ref: Under Secretary of Defense Memorandum: TLSCM Metrics, Nov. 22, 2005**

Availability and Reliability Definitions & Formulas

$$A_o = \frac{\text{UpDays}}{\text{UpDays} + \text{Downdays}}$$

$$Acr_o = \frac{\text{UpDays}}{\text{UpDays} + \text{DaysDownforCriticalFailure}}$$

$$\text{MDBM} = \frac{\sum \text{Daysinservic}}{\sum \text{EROs}}$$

$$\text{MDBCM} = \frac{\sum \text{Daysinservic}}{\sum \text{CriticalEROs}}$$

$$\text{MDBF} = \frac{\sum \text{Daysinservic}}{\sum \text{Parts}}$$

$$\text{MDBCF} = \frac{\sum \text{Daysinservic}}{\sum \text{CriticalParts}}$$

MMBM = MDBM * OperationalUsageFacto

MMBCM = MDBCM * OperationalUsageFacto

MHBM = MDBM * OperationalUsageFacto

MMBCM = MDBCM * OperationalUsageFacto

MMBF = MDBF * OperationalUsageFacto

MMBCF = MDBCF * OperationalUsageFacto

MHBF = MDBF * OperationalUsageFacto

MHBCF = MDBCF * OperationalUsageFacto

MDT Definitions & Formulas

Maintenance Down Time (MDT) - Represents the total time in days the end item was in maintenance. MDT is calculated as the difference between the Date Closed for the ERO and the Date Received in Shop.

Logistics Response Time (LRT) - This is a calculated field representing the total amount of time in days that the equipment in maintenance for a specific maintenance action (unique ERO) was waiting on parts. It is calculated as the difference between when the last part was received and when the first part was ordered.

Logistic Response Time Critical (LRTCR) - This is a calculated field representing the total amount of time in days that the equipment in maintenance for a specific maintenance action (unique ERO) was waiting on critical parts as determined by the Criticality Code. It is calculated as the difference between when the last critical part was received and when the first critical part was ordered.

Logistic Response Time Non-Critical (LRTNCR) - This is a calculated field representing the total amount of time in days that the equipment in maintenance for a specific maintenance action (unique ERO) was waiting on non-critical parts as determined by the Criticality Code. It is calculated as the difference between when the last non-critical part was received and when the first non-critical part was ordered.

Administrative Down Time (ADT) - This is calculated field in days representing remaining amount of time that cannot be attributed to LDT (waiting parts) or AMT (active maintenance time) for an ERO. ADT=MDT-LDT-AMT

Administrative Down Time Critical (ADTCR) - This is calculated field in days representing remaining amount of time that can not be attributed to LDTCR (waiting critical parts) or AMTCR (active maintenance time for critical parts) for an ERO. ADTCR=MDT-LDTCR-AMTCR.

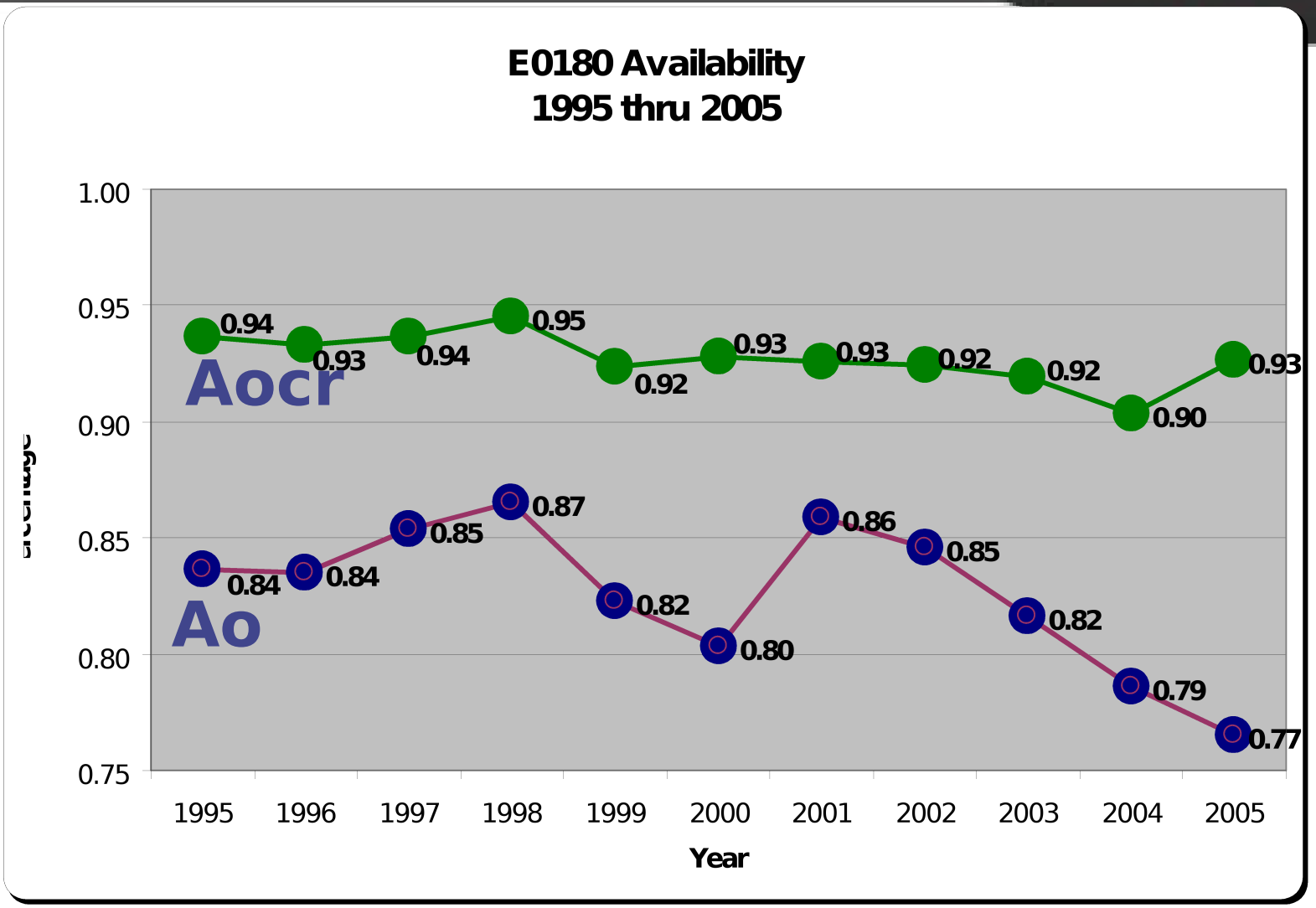
Administrative Down Time Critical (ADTNCR) - This is calculated field in days representing remaining amount of time that can not be attributed to LDTNCR (waiting non-critical parts) or AMTNCR (active maintenance time for non-critical parts) for an ERO. ADTNCR=MDT-LDTNCR-AMTNCR

SOE Acronyms

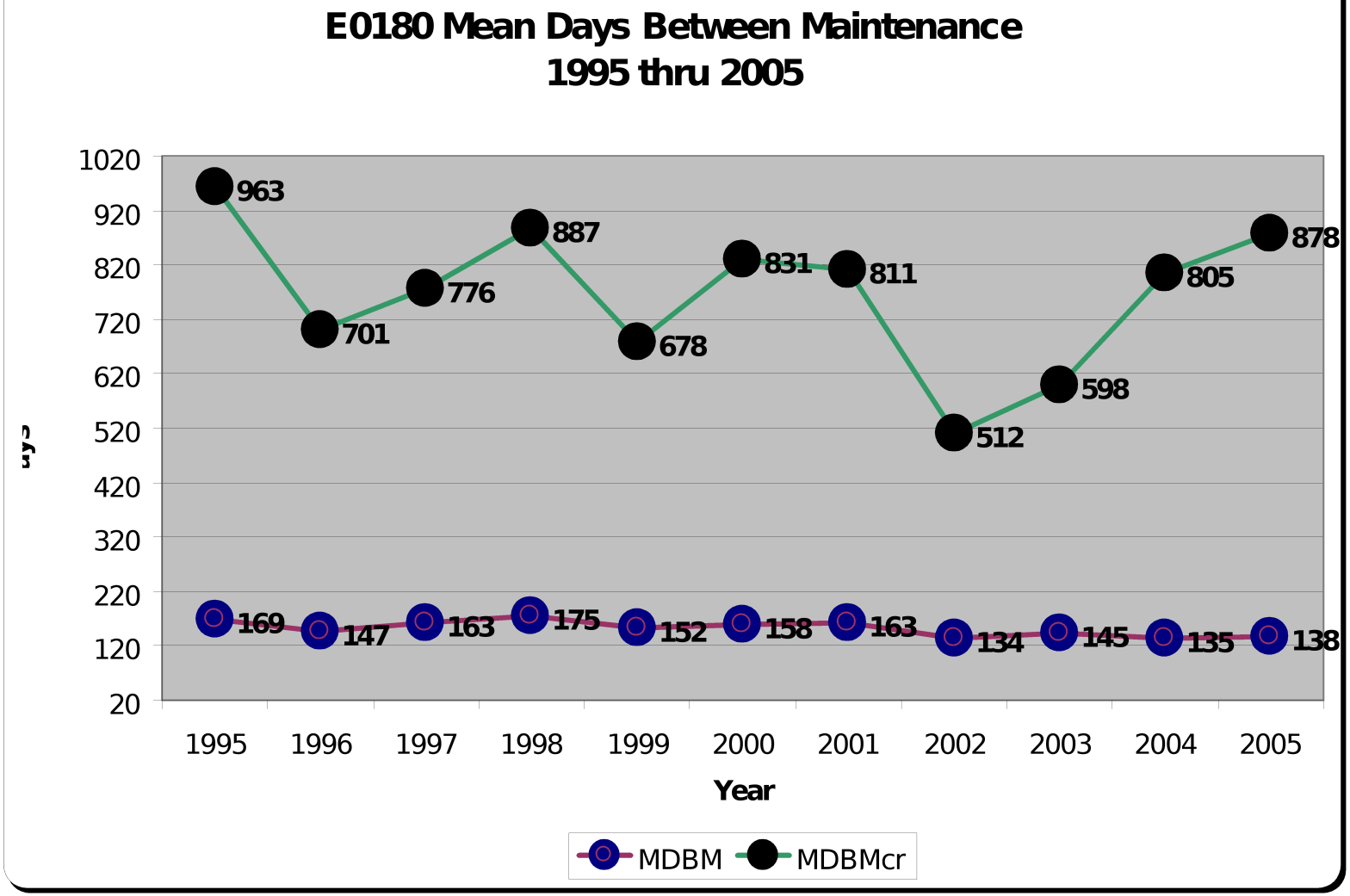
Ao - Operational Availability
MDBM – Mean Days Between Maintenance
MDBCM – Mean Days Between Critical Maintenance
MMBM – Mean Miles Between Maintenance
MMBCM – Mean Miles Between Critical Maintenance
MHBM – Mean Hours Between Maintenance
MHBCM – Mean Hours Between Critical Maintenance
MDBF – Mean Days Between Failure
MDBCF – Mean Days Between Critical Failure
MMBF – Mean Miles Between Failure
MMBCF – Mean Miles Between Critical Failure
MHBF – Mean Hours Between Failure
MHBCF – Mean Hours Between Critical Failure
Prob MC- Probability of Mission Complete

MDT – Maintenance DownTime
AMT – Active Maintenance Time
AMTCR – Active Maintenance Time, Critical
AMTNCR – Active Maintenance Time, Non-Critical
LRT – Logistics ResponseTime
LRTCR – Logistics Response Time, Critical
LRTNCR – Logistics Response Time, Non-Critical
ADT – Administrative Delay Time
ADTCR – Administrative Delay Time, Critical
ADTNCR – Administrative Delay Time, Non-Critical

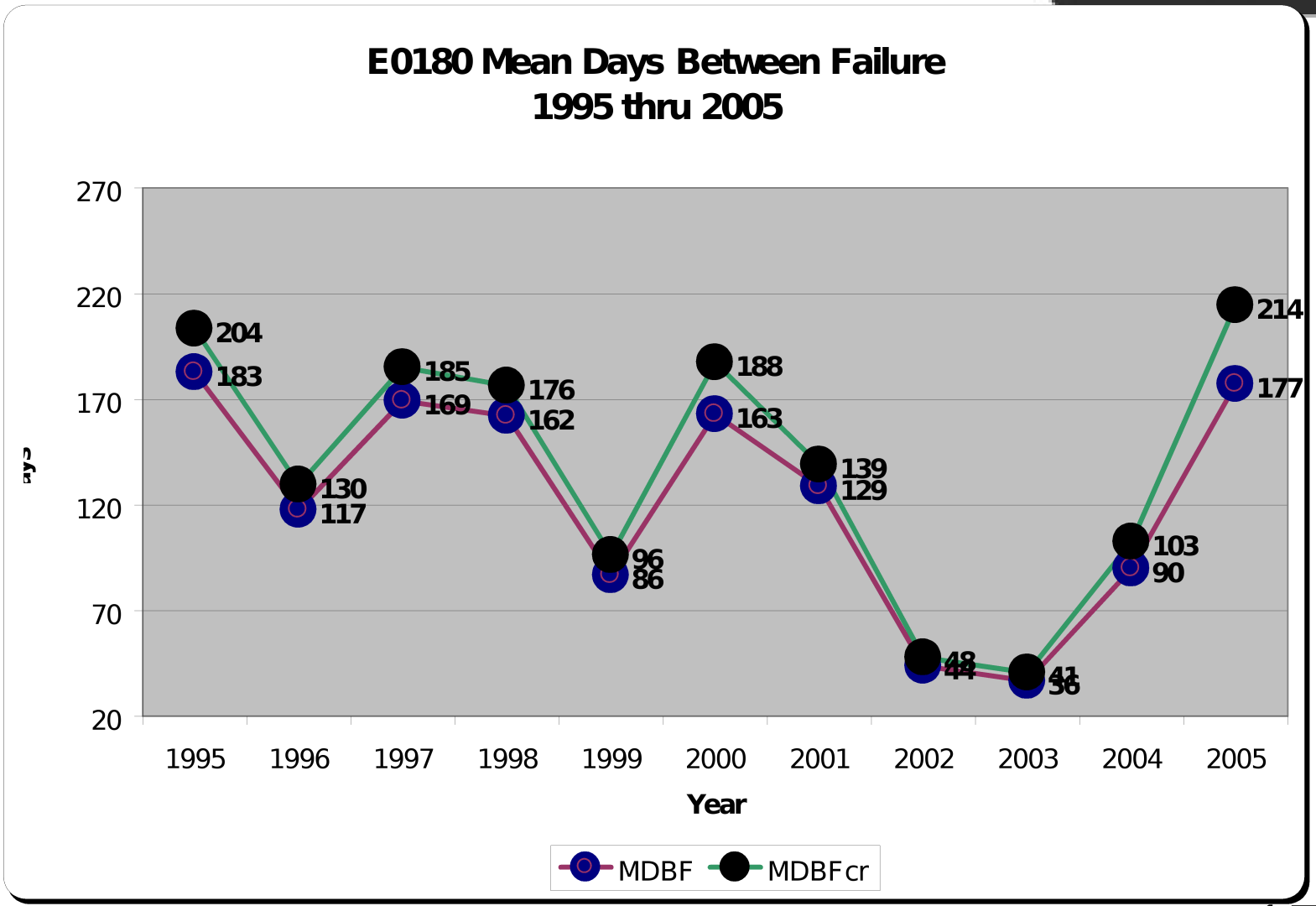
Current Capabilitie



Current Capabilitie



Current Capabilitie

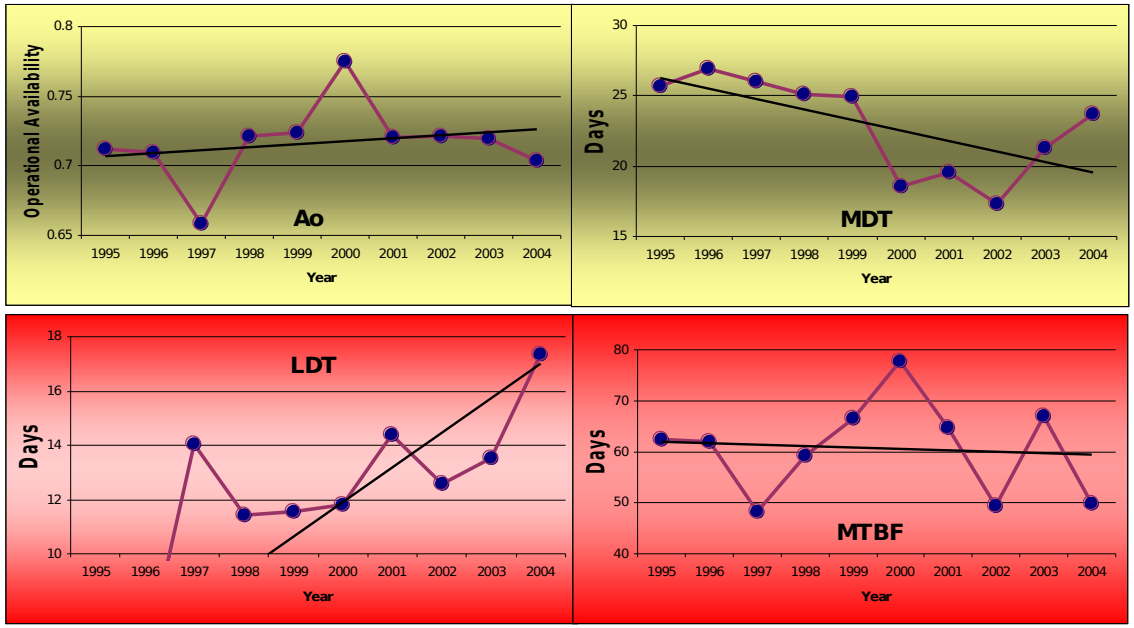


Moving Forward

- Defining Process Efficiency and System Performance measures.
  - Starting to move toward adoption of TLCSM Defined Metrics
- Command reporting for PM/PGD
  - Top level scoring.
- Incorporating SOE Tool into LCMI.
- Predicting Performance

LAV, Light Assault, 25MM

SOE Summary: 1994-2004



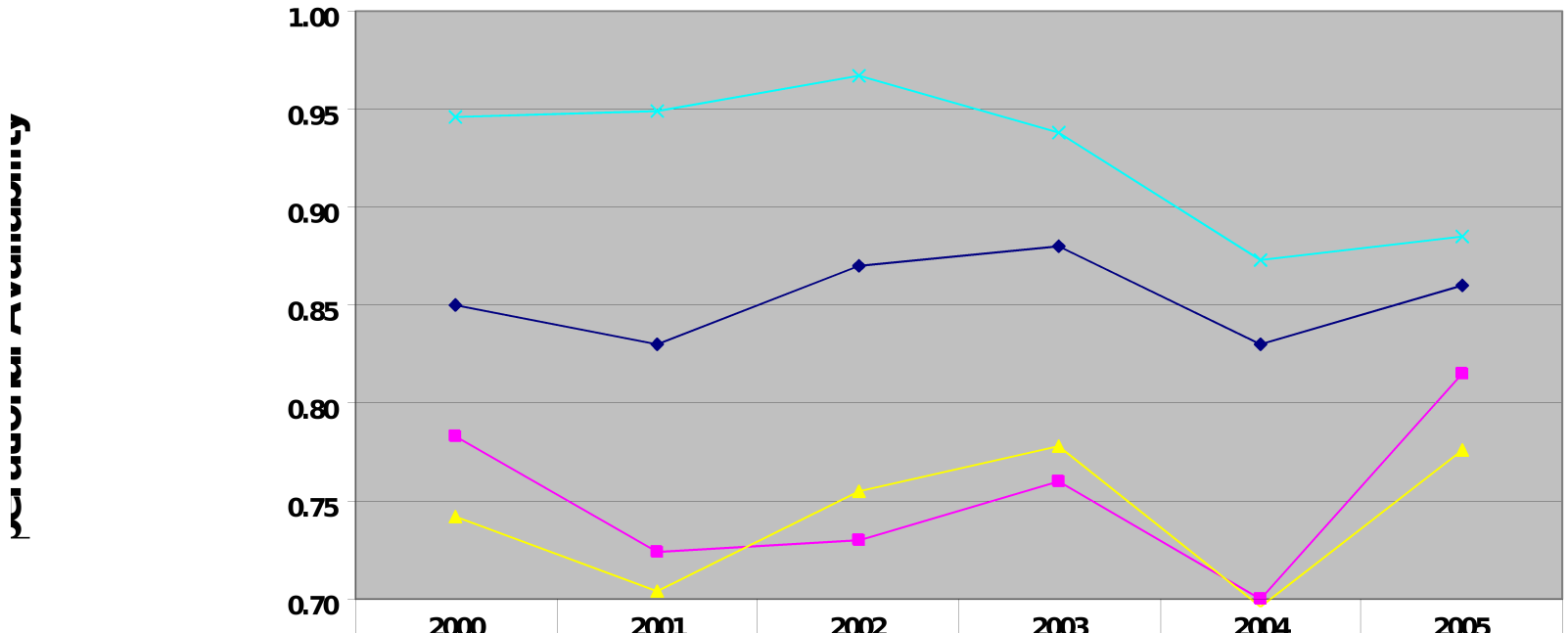
Parameter	Value
Unique S/Ns Reporting	351
Total EROs closed	3076
Total Critical EROs closed	566
Avg MDT	23.69
Avg MDT critical	68.76
Mean Days between Failure	3.57
Mean Days between Critical Failure (MTBOMF)	49.76
Avg LRT	17.37
Avg LRT Critical	33.62
Critical Availability (Aocr)	0.70

Top 5 Critical Parts (2004)	
NSN	Nomenclature
2510-01-157-4078	Window, Vehicular
2610-01-160-9934	Tire, Pneumatic, Vehicle
5980-01-480-4875	Control-Display, Opto
2530-01-187-	Rim, Wheel, Pneumatic

Critical Vehicles (2004)		
S/N	Criticality Score	Ao
521596	0.9437	0.05
521380	0.9858	0.04
521383	0.9473	0.20
521374	0.8903	0.08
521663	0.8611	0.04

TLCSM/USMC Metrics
Command & PG Rollup
2000 thru 2005

Critical Operational Availability



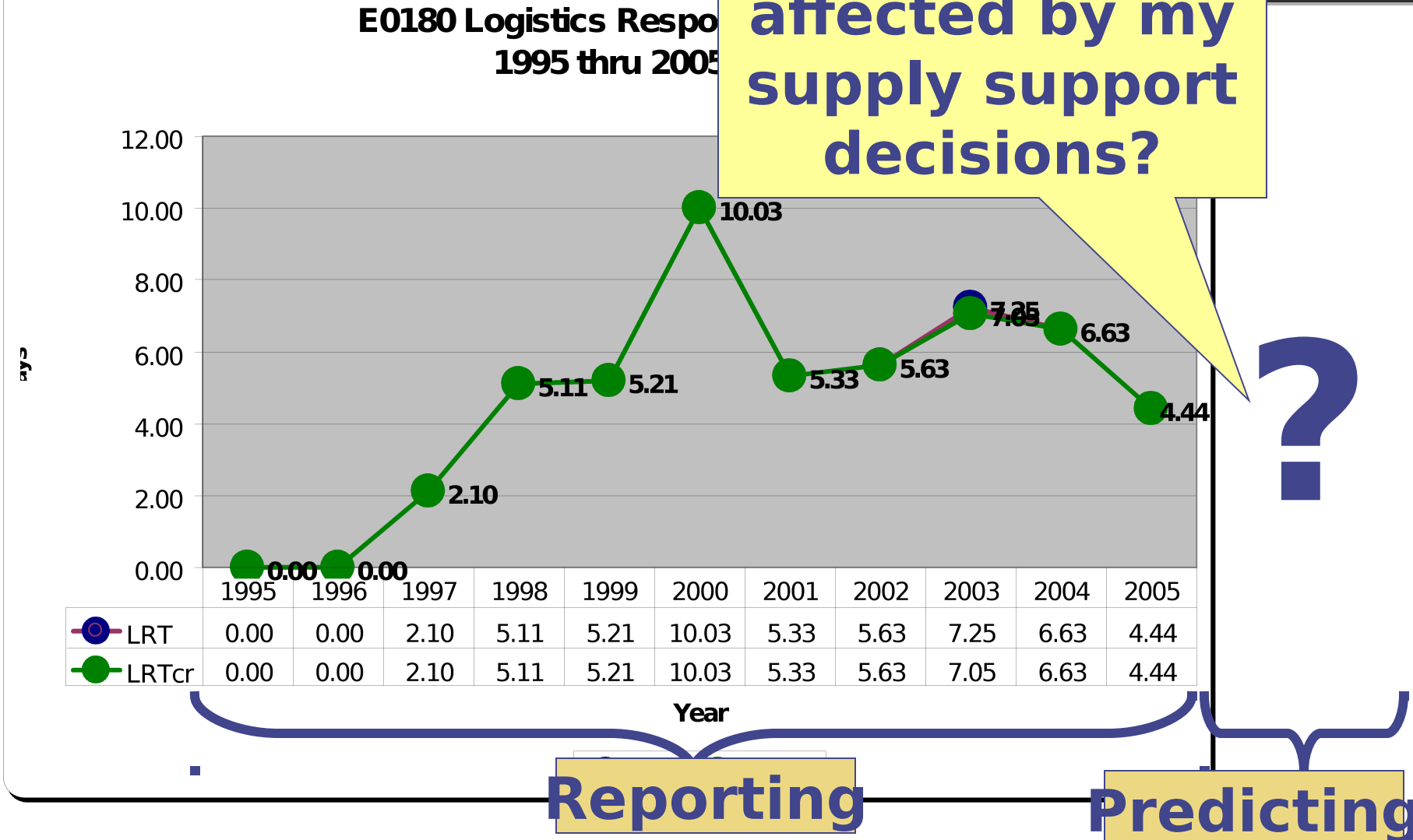
	2000	2001	2002	2003	2004	2005
Command Aocr	0.85	0.83	0.87	0.88	0.83	0.86
LAV Aocr	0.78	0.72	0.73	0.76	0.70	0.81
PG14(AFSS)	0.74	0.70	0.76	0.78	0.70	0.78
PG15 (GTES)	0.95	0.95	0.97	0.94	0.87	0.88

Year

Moving Forward

- Reporting:
  - Using historical data to evaluate past performance and indicate areas targeted for improvements.
  - Using historical data to support future decisions (Trending).
  - Tool: SOE TOOL
- Predicting:
  - Using modeling and simulation tools to “predict” the future performance/requirements for operations.
  - Using modeling and simulation tools to support future decisions with more accuracy.
  - Answering the question, “How much is it going to cost to operate this equipment in the proposed environment or manner?”
  - Answering the question, “How many assets do I need to successfully support the mission?”
  - Tool: ATLAST by CWS.

How is LRT affected by my supply support decisions?



Points of Contact & Website

- Mrs. — CASC Team Lead @usmc.mil
  229-639-6601 (DSN 567)
- Capt. — CASC Material Logistics Officer
  @usmc.mil
  703-432-3443 (DSN 378)
- Mr. — CASC Engineer
  @usmc.mil
  229-639-8018 (DSN 567)
- User accounts available on request
- https://wstiac.alionscience.com/usmc
- Submit request for access via link at bottom of the page. “Request an Account”
- Sponsor ---- enter “CASC” as your sponsor.

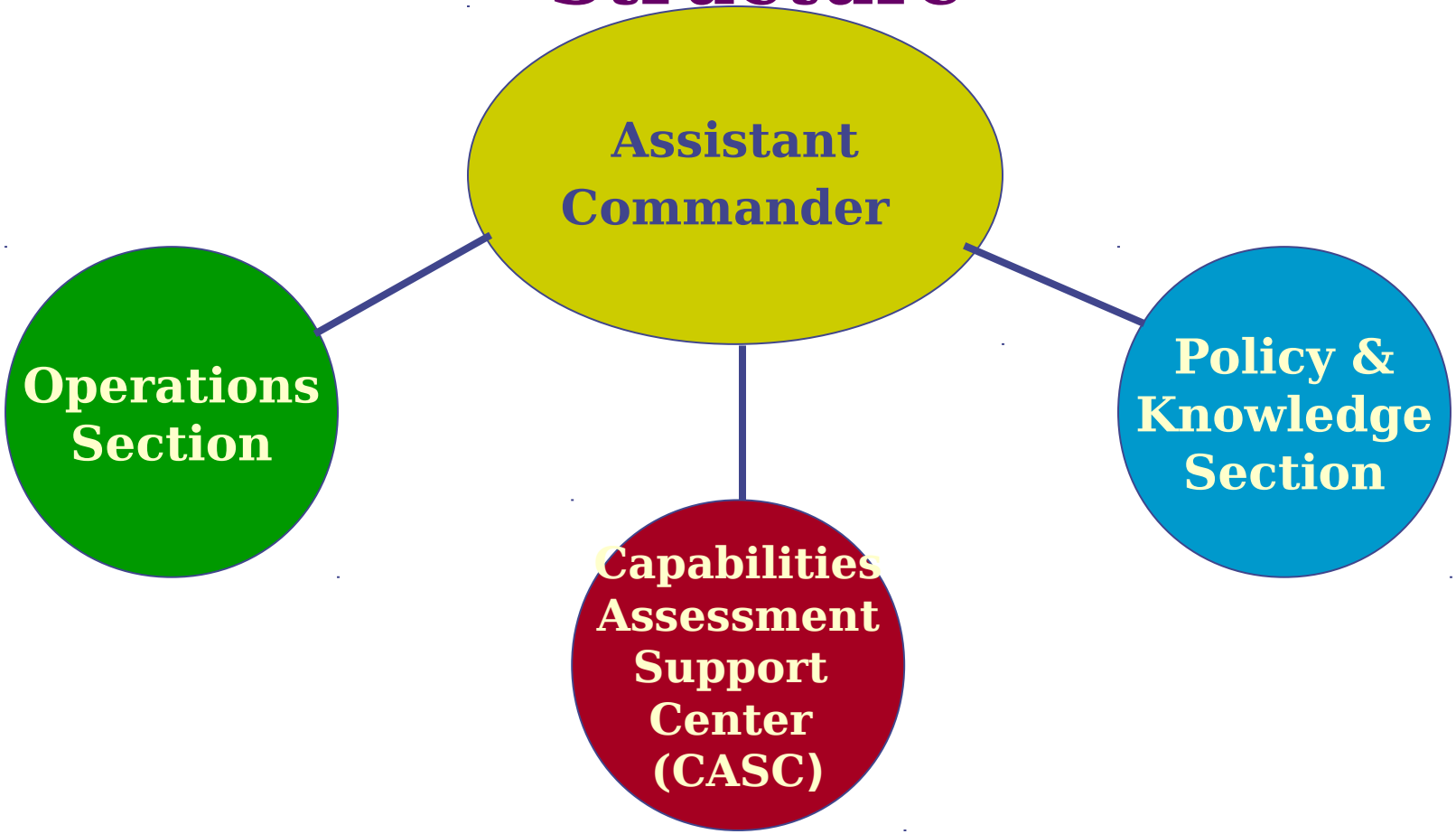
Q&A

Back-up Slides

A/C Product Support Mission

Serve as the Command's principal agent to improve the sustainment and disposal of fielded Marine Corps ground weapon systems and equipment in support of the Warfighter.

A/C PROD Organizational Structure



Capability Assessment

Definition

The process of reviewing and analyzing acquisition programs and fielded systems/equipment to measure the progress and performance of MC Ground Equipment throughout the Life Cycle using Integrated Logistics System Assessment Models, Information Management Tools and Legacy Data.

CASC Mission

Serve as the MCSC focal point for Readiness reporting and Total Life Cycle Systems Management Assessments by measuring all aspects of progress and performance of fielded Marine Corps Ground Equipment throughout the life cycle.